



SERUM VITAMIN D STATUS AMONG DIABETES MELLITUS TYPE II CASES AND APPARENTLY HEALTHY SUBJECTS

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ABSTRACT

According to the WHO, there are roughly 422 million of diabetes cases and is estimated to be doubled by 2030. Diabetes mellitus type II (DM-II) alone consist of 85 to 90 percent. India is one of the epicenter of worldwide DM-II prevalent. Nearly 60 million Indian population are affected and over 0.9 million people lost their lives due to the disease. The number of the disease population is believed to be raised to 109 million by 2035. Vitamin D below 30 ng/ml is said to be suboptimal. Low vitamin D is also another public health issue in India and many other developing nations. Indian population from all age groups throughout the nation, are at the edge of suboptimal vitamin D. Nearly 70 to 90 percent of apparently healthy subjects have under vitamin D level.

Objective: to provide comparative vitamin D status among apparently healthy and diabetes mellitus type II patients.

Materials and Methods: the study was conducted among 100 DM-II patients (attending OPD of the institute) and 50 apparently healthy subjects at the department of biochemistry, MM Institute of Medical Sciences and Research, Mullana in collaboration with department of medicine.

Results: Diabetic cases had 19.09 ± 5.34 ng/ml of serum vitamin D level. Healthy control subjects had 26.55 ± 3.61 ng/ml of serum vitamin D. 10 DM-II cases had deficient amount of vitamin D and 90 cases were under insufficient vitamin D. Majority of healthy subjects (82%) had insufficient vitamin D.

Conclusion: Majority of individuals have suboptimal vitamin D and are at potential risk for developing the diseases related to low vitamin D. therefore, it is suggested to optimize vitamin D level.

KEYWORDS: Diabetes mellitus type II, WHO, vitamin D.

BACKGROUND:

Diabetes is global pandemic. The occurrence of diabetes mellitus is increasing day by day. This number is estimated to be doubled by 2030. DM-II consists of 85 to 90 percent of total diabetic cases. India is no exception from the influence of diabetes mellitus type II, but this nation is highly influenced. It is thought that India is one of the epicenter of worldwide DM-II prevalent. It is estimated that nearly 60 million Indian population are affected and is believed to be raised to 109 million by 2035. The disease can be caused due to multifaceted interaction between adoptable/changeable and non-changeable hazardous factors. Changeable factors like less physical activities, smoking, obesity and poor diet practice may be important risk factors.²

Suboptimal vitamin D status is another global challenge for healthy public life. Vitamin D below 30 nanograms per milliliter is said to be suboptimal. Low vitamin D is also another public health issue in India and many other developing nations. Indian population from all age groups throughout the nation, are at the edge of suboptimal vitamin D. Nearly 70 to 90 percent of apparently healthy subjects have under vitamin D level.³

Suboptimal vitamin D has been linked to diabetes mellitus type II. Normal functioning of beta cells to secrete insulin is compromised due to low vitamin D and consequently insulin functioning is also compromised due to low vitamin D. Presence of VDRs, DBP and 1-alpha-hydroxylase in various tissues indicate possible role of vitamin D in insulin secretion and function. In this way, low vitamin D have its role in genesis of diabetes mellitus type II.⁴ This article attempts to provide comparative vitamin D status among apparently healthy and diabetes mellitus type II patients present in the hospital of the institute.

MATERIALS AND METHODS:

There were total 150 well-informed, informed consented subjects of either sex and 35-70 years of age group. One hundred patients suffering from DM-II were placed in group 1 (serving as cases) and fifty (50) apparently healthy individuals with matched age were placed in group 2 (serving as a healthy control). Serum vitamin D was estimated from the serum of the participants by CLIA (chemiluminescence immunoassay) method. Results obtained were statistically analyzed.

Observations:

There were 53% male and 47% female participants among cases. 40% male and 60% female participants among healthy control. Among the patients, 17 cases were under good control, 28 were under fair control and 55 were under poor control.

Diabetic cases had 19.09 ± 5.34 ng/ml of serum vitamin D level. Healthy control subjects had 26.55 ± 3.61 ng/ml of serum vitamin D (shown below in table 1)

Table 1: Serum vitamin D levels among cases and healthy control

	Mean (ng/ml)	p
Cases (n= 100)	19.09 ± 5.34	<0.00001*
Healthy Control (n= 50)	26.55 ± 3.61	

*Significance at $p < 0.01$

Majority of healthy subjects (82%) had insufficient vitamin D. Only 18% subjects had sufficient vitamin D. No subject was under deficient and potential toxicity. The highest vitamin D level was 36.2 ng/ml. The lowest level of vitamin D among the healthy control was 20.1 ng/ml. Females had slightly higher vitamin D level.

10% cases had deficient vitamin D and 90% were under insufficient vitamin D. Out of 90 cases, 26 had vitamin D level between 10 to 19 and 64 had 20 to 29 nanograms per milliliter of 25(OH)D. No cases were found with sufficient or potential toxic level of 25(OH)D (shown in Table 2). The highest vitamin D level found among cases was 28.3 ng/ml and the lowest level was found to be 5.5 ng/ml.

Table 2: Vitamin D status among cases and healthy control

	Cases (%)	Healthy control (%)
Severe deficient: (less than 10 ng/ml)	10	Nil
Deficient: (10 to 19 ng/ml)	26	Nil
Insufficient: (20 to 29 ng/ml)	64	82
Sufficient: (30 to 100 ng/ml)	Nil	18
Toxicity: (>100 ng/ml)	Nil	Nil

DISCUSSION:

Low 25(OH)D status is evident among all age groups in Indian population and the danger is by no means stopping. Various studies have shown prevalence of 70%-100% in the general population. There is very little or no data from this part of the country regarding vitamin D and diabetes mellitus type II. The average serum vitamin D level among cases was 19.09 ± 5.34 ng/ml (Table 1) which is lower compared to healthy control subjects (26.55 ± 3.61 ; Table 1). Significant dif-

ference ($p < 0.00001$; Table 1) was noted in mean vitamin D level among the healthy and diabetic subjects. These results are very much competent with other studies conducted in different parts. A study by Bayani et al. among 120 diabetes cases and 120 healthy subjects showed vitamin D levels 18.7 ± 10.2 ng/dl and 24.6 ± 13.5 ng/dl ($p = 0.002$) among diabetes cases and healthy control respectively.⁵ Taheri et al. demonstrated 85% diabetics mellitus type II patients and 79 percent of healthy people were suffering from deficiency or insufficiency of vitamin D.⁶ Mukherjee et al.⁷ from Odisha, Chaudhary et al.⁷ from Kolkata, Laway et al.⁸ from Jammu and Kashmir, Siddiqui MH et al.⁹ from Greater Noida and SV et al.¹⁰ from Pondicherry have reported similar results as of the current study but Bajaj AH et al.¹¹ from Mumbai reported more number of vitamin D deficiency among non-diabetes than diabetes. Another study by Sheth et al.¹² from Ahmedabad reported deficiency vitamin D among 91.4 percent of diabetes mellitus type II cases and among 93.0 percent healthy people but with no significant difference.

Many factors affect vitamin D, including variation in age, poor sun exposure which again may due to skin pigmentation, use of sunscreen, clothing and season and latitude. Other factors may be vegetarian food habits, increasing pollution, lack of government programme for fortification of vitamin D and older age. Synthesis of vitamin D is declined with increasing age because skin thickness decreases in humans linearly after the age of 20 years. Reduced cutaneous synthesis and dietary inadequacy could be the contributing factors for lower vitamin D levels in the elderly. Middle age groups consisted mainly of employed persons with long indoor working hours and less duration of exposure to sunlight. This group is also likely to eat irregularly and junk food. These factors could translate into lower vitamin D levels.¹³⁻¹⁶

CONCLUSION:

Low vitamin D was found among the participants. This will help people of this locality to be aware of impacts of low vitamin D. The study could have been better had we considered larger population. This study was not follow-up so, other related factors were not considered. The present case-control research will help the clinicians for effective treatment of diabetes mellitus type II. Therefore, it is suggested that serum vitamin D should be under optimal level for prevention of the disease and for better prognosis of the disease so that individual could help in the betterment of the society and the country.

No conflict of interest has been reported.

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